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ABSTRACT

A survey of relevant research strongly suggests that the Personalized System of Instruction (PSI) offers considerable potential for community college instruction. It has five main features: students move at their own rates of speed, utilize written study guides, demonstrate mastery of each unit before continuing, meet with proctors for periodic testing and feedback, and attend periodic lectures primarily for motivation. A typical course would incorporate these five main features and could work mechanically in subject areas from history and Spanish to psychology. Potentially serious limitations include instructor work load, study problems for poor readers, initially high start-up costs, and controversial grading policies. Personalized in the sense that it offers personal student-instructor contact, PSI is discipline rather than student oriented, with the potential for some group interaction, a reliance on written study guides as a means of instructor-student communication, and with the instructor's role not altered but changed in the way in which it is executed. PSI offers a way to organize instruction that will enable diverse groups of students in the community college to handle virtually any type of course at their own speed, and in a place of their own choosing. Although its potential is largely untested, PSI warrants serious consideration.
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PSI In Community and Two Year Colleges - Potential and Limitations

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U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
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Community and two year colleges today find themselves deeply involved in a continuing effort to improve instruction in their classrooms. In some instances these efforts reflect the desire seemingly inherent in many individuals to fulfil as well as is humanly possible the learning contract implicit in the student-teacher relationship. In other instances, this effort reflects deliberate institutional attempts to accommodate student populations that continue to increase in diversity of talents and interests as well as in numbers. Usually these efforts involve the isolated use of heretofore locally untried teaching methods, scheduling procedures, or instructional materials and equipment. But among all the "innovations" that exist today, faculties in community colleges have given relatively little attention to one form of instruction that seems particularly relevant to their needs and interests. This system is known as PSI - Personalized System of Instruction.

PSI is not really new. It has been around for more than a decade now, ever since it was tried initially by Columbia psychologist Fred S. Keller in the mid-1960's. Since then it has been refined

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considerably and has been used at virtually all levels of education and in all subjects - including the physical, behavioral and social sciences; technical and vocational subjects, and history, the language arts and even the humanities.[1]

Experience with teaching a PSI course and review of the voluminous research into PSI indicate that PSI has much to offer community and two-year colleges. Indeed, faculty in these institutions grappling with the problems of how to enhance student learning in their subjects, how to cope with the abilities and interests of diverse student populations, how to deal effectively with increasing class sizes, how to reach increasing numbers of off-campus students and how to attract more students to their favorite courses - all in the face of increasingly scarce financial resources - may well find in PSI at least a partial solution to their problems.

The Nature of PSI

As generally described, PSI exhibits five basic features: (1) students move through a course at their own individual rates of speed, (2) using written study guides to direct their progress through the units of the course, (3) demonstrating mastery of each unit before proceeding to the next, (4) meeting with proctors for periodic testing and immediate feedback, and (5) attending periodic lectures offered primarily for motivational purposes.[2] While none of these features are in themselves new, their combination represents a rather unique mode of instruction that weds basic principles of mastery learning and behavioristic psychology. Moreover, because PSI courses require no special instructional hardware or facilities of any kind, PSI

represents a relatively inexpensive method of instruction. American colleges and universities offer more than 1500 PSI courses today, more than triple the number offered just three years ago.[3]

PSI presents impressive credentials. A recent survey of research on teaching suggests that when compared to students taking the same courses taught conventionally, students in PSI courses learn more (as measured by scores on final exams), retain it longer (as measured by grades on follow-up tests administered 6 to 18 months after completion of the course), and do better in courses taken simultaneously with and subsequent to the PSI course.[4] This and other research also suggests students find PSI courses attractive, challenging and in most instances preferable to the same courses conventionally taught.[5] That most of this research (some of which, incidentally, has some limitations[6]) has been done at the four-year college and university level merely underscores the importance of a thorough investigation of PSI at the community and two-year college level.

Space limitations prohibit a detailed description and analysis here of all aspects of PSI relevant to community and two-year college teaching. Yet it does offer an opportunity to explore this instructional system by dealing briefly with four fundamental questions: (1) What is a PSI course like in actual operation? (2) What happens when you use PSI to teach a specific course? (3) What are some of the apparent advantages and limitations of PSI for community colleges? and (4) What are some of the nuances of PSI? Observations generated by these questions provide the focus for the comments that follow.

A Typical PSI Course

A course utilizing the principles of PSI incorporates the five basic features outlined above. One such course - an introductory college course in history - consisted of twenty units through which the students moved in sequence using mimeographed study guides.[7] These guides were keyed to a standard text and selected reference materials in the local college library.

Students moved through the course units at their own individual rates of speed. Although no regularly scheduled conventional class meetings were held, the instructor and three student proctors (a college graduate student and two students who had taken the course previously) were present in an assigned classroom for three-four hours of each of two days a week. Students reported to this classroom when they wished help with assignments or when they were ready to move from one unit to the next.

When an individual student felt that he or she had mastered the stated objectives of a given unit, he/she would report to this classroom for a mastery test administered and scored by one of the proctors. Students who mastered such an exam (by scoring 85% or higher) moved on to the next unit. Students unable to achieve mastery of the unit objectives, after interviews with a proctor or the instructor, restudied the unit and took other forms of the unit test. Students could repeat a unit test as many times as necessary without any grade penalty in order to master a unit and proceed with the course. Mastery of twenty units and successful completion of a final exam guaranteed students an A grade (representing subject mastery) for the course.

The Results of a Course Using PSI

My personal experience with PSI generally confirms the results of existing research on the use of PSI. PSI works mechanically in a freshman-sophomore history course just as it does in similar courses - chemistry, Spanish, psychology and other subjects. Students in a PSI course (including history and related courses) can achieve the cognitive objectives generally accepted for introductory-type courses. In fact, on post-tests slower students often reach the same level of achievement as do faster students, thus eliminating the significant gaps between the two revealed on course pre-tests.

Furthermore, students respond favorably to the use of PSI. They cite as especially attractive the opportunity to move at their own rates of speed, the immediate feedback on tests, and the clearly and publicly stated learning objectives. Although many of them indicate they work harder in a PSI course than in conventional courses, they acknowledge they learn more. They also report less worrying about grades or teacher-student personality conflicts. Finally, students in PSI courses generally make more efficient use of their time - in other courses as well as in the PSI course itself.[8/]

But PSI - in its ideal form - has limitations, too. Most research and personal experience suggest that lectures do not well serve their voluntary, motivational function - the students qualified to attend simply don't show up no matter how good the lecture. Not all students can pace themselves - at least at the pace preferred by registrars or school calendar-makers! Proctors, while a key to an effective PSI course, require supervision that places additional demands on instructor time. And managing a PSI course can sometimes

be a hectic experience, to say the least. Yet, in spite of these limitations PSI does work. Most students and many instructors enjoy such courses. And PSI courses can accommodate large numbers of students in almost any course or subject.

Some Advantages and Disadvantages of PSI

Certainly more experience with PSI at the community college level is needed before anything definitive about its real value can be stated. Yet what we presently know about PSI suggests that it has many potential advantages for teaching and that these can be just as beneficial to community colleges as they are to other levels of instruction.[9/] For example:

1. PSI improves student learning in terms of achievement, retention and transfer.
2. PSI gives students an opportunity to move at their own rates of speed thus allowing them to set their own study schedules in terms of other demands on their time.
3. PSI leaves a detailed record thus enabling instructors to identify and correct specific course weaknesses (confusing questions, inappropriate readings, irrelevant activities, poor test items) and thus to improve the course for future use.
4. PSI offers opportunities for more individual student-instructor contact than does conventional teaching.
5. PSI sharpens teaching. Creating clearly stated objectives and directions and selecting appropriate readings,

test items and learning activities forces one to weed out the irrelevant and to structure courses carefully - clearly earmarks of effective teaching.

6. PSI makes instructors more sensitive to student needs and interests and to differences in student abilities.
7. PSI offers a way for educational institutions to offer courses for students unable (because of job or family responsibilities) to attend classes on a regular basis as well as for students of varying academic abilities.
8. PSI appears to make it possible for a single instructor and an appropriate number of proctors to provide a type of personal instruction to large numbers of students at a cost below that required to teach a similar number of students with conventional methods.
9. PSI permits more objective diagnosis of instruction for purposes both of improving teaching and evaluating instruction.
10. PSI offers students guided training in the techniques of independent study, so vital a part of upper division study in most colleges and universities.

PSI also seems to have some potentially serious limitations as a mode of instruction for freshmen and sophomores.[10/] Some of these limitations appear to be that:

1. Students work much harder - often "too hard" they claim - than they do in conventional courses.

2. Instructors work much, much harder in planning PSI courses than in planning and conducting conventional courses. Writing twenty unit study guides, three or more forms of twenty unit tests (with answer keys) - most of which consist of objective test items, and organizing the logistics of a PSI course are time consuming and energy sapping tasks even when appropriate released time is provided.
3. By relying essentially on the written word as the major means of communication, PSI courses may create study problems for students who are poor readers.
4. PSI limits opportunities for instructors to capitalize on spontaneous learning often generated in class discussions.
5. Initial start-up costs for PSI may be rather high. It generally requires at least half a semester of full-time preparation to prepare the tests and unit study guides needed to get a PSI course underway.
6. Grading policies can become complex and controversial, for if all students master the course requirements in time final grades of A may be earned by all students in a class.
7. PSI may restrict student-initiated inquiry and student-directed learning.
8. PSI restricts or eliminates opportunities for knowledgeable instructors to engage with groups of students in the kind of spontaneous verbal interactions that can

communicate the enthusiasm, excitement, vitality and insights born of deep immersion in the content of the course which is presumably the instructor's specialty.

9. PSI can threaten the security of faculty, especially when viewed as a way to cut costs by using fewer faculty to teach more students.
10. PSI courses too often become vehicles for teaching only low-level facts, definitions and generalizations while neglecting higher order cognitive skills, concepts and affective objectives.

PSI - Appearances and Realities

Obviously the above listing does not exhaust the perceived or alleged strengths and weaknesses of PSI. Certainly, some features of PSI that would appear to be advantages for a specific discipline like chemistry might work to the disadvantage of another discipline such as English. Where PSI may prove advantageous to students in one type or level of institution, it might work to the disadvantage of students in another institution. Such judgments must be made with caution, however. In some instances the limitations of PSI seem more imagined than real. Five of these supposed limitations deserve comment here.

First, as generally practiced PSI actually appears to be a misnomer. It is not really personalized in the sense that it meets the needs or interests of particular individuals. Yet, PSI is personalized in the sense that it offers personal student-"instructor" contact to a much greater extent than occurs in most conventionally

taught undergraduate courses. In general, individual students in PSI courses have at least ten hours of one-to-one contact with an instructor or proctor during a PSI course, considerably more one-to-one contact time than they have in a similar lecture-discussion version of the same course.

Secondly, PSI seems, on the surface at least, to be a form of "individualized instruction." And in a sense, it is individualized more than conventional large group lecturing or small group discussion courses. PSI does permit a student to move at his or her own rate of speed and does offer opportunities for individual tutoring when requested. But PSI is more individual than individualized. As commonly used it does not respond directly to different individual needs. As originally conceived, PSI is discipline rather than student-oriented. This instructional approach seems to say: "Here is a body of knowledge (i.e., skills, facts, concepts, generalizations) to master. Take your time. Do it this way. I will provide whatever help you need. But, master it!" Little if any attention is given to varieties of learning styles, use of different learning routes to the same objective, or use of materials appropriate to different ability levels. Nor does PSI in its original form permit students to follow their own interests, to be truly independent learners.

This is not to say, however, that PSI cannot be individualized or personalized more than it tends presently to be. By offering diagnostic tests preceding a unit students can be given an opportunity to skip units which they have, in effect, already mastered, or at least set their own learning goals for areas in which they evidence a lack of mastery. By providing units in which students can select

their own topics, choose from a variety of media geared to different interests and ability levels, and/or generate their own questions, PSI-based self-paced courses may indeed be much more individualized than they now are.

PSI also often appears to suffer from a third limitation. Because of its attention to individual self-pacing, PSI seems to limit opportunities for student-to-student interaction in groups. In fact, emphasis on individual testing and proctoring and on each individual moving at his or her own rate of speed seem to prevent any kind of group work at all. Whereas possibilities of group interaction may exist early in a course when most students are bunched up on the same units, these possibilities decrease as individual students proceed to get strung out across a large number of units as the course progresses.

Yet opportunities for group interaction do exist within the PSI structure without violating either the mastery or self-pacing principles. Just as student-student interviews can be arranged, so can group-instructor or group-proctor interviews be conducted. In some units students can work with partners instead of working alone. Floating units, culminating in small group discussions, may provide opportunities for student-to-student discussions without impairing the rate of progress through the course of any individual student. Moreover, learning activities built around audio or visual media can be arranged to encourage students to participate in small groups. Thus, although PSI strictly-adhered-to may mitigate against small group interaction, in practice much voluntary or planned grouping can occur and structures like the floating unit or activities such

as audio-visual modules can be deliberately devised to require such learning experiences.

Because of its reliance on written study guides as the means of instructor-student communication, PSI may initially appear to be unworkable for students who are poor readers. This may be a problem in some instances, but it can be overcome. The contents of a written study guide may be put on a tape cassette for students to listen to as they read the printed guide or even to use in place of the printed guide itself. Such an approach, however, seems to abdicate any responsibility for helping students improve their reading abilities, one important function of education at any level. Hence, a more useful approach would be to construct written study guides at the reading levels of the students who will use them. By gradually raising the reading levels of these guides as the course progresses, instructors can then help students stretch these skills upward and improve their reading as they learn the content of the course. Similar attention might also be given to the text(s) selected for use in PSI courses - just as it should be (but most frequently is not) given to the selection of texts in any conventional course.

Finally, to some observers, PSI seems to alter dramatically the role of the instructor. Many instructors see PSI as reducing them to managers and paper shufflers, destroying their traditional role as teachers. Such is not the case, however. The role of instructor in a PSI course actually remains similar to his or her role in a conventionally taught course. It is the means of discharging this role that changes, however.

For example, the instructor's role in a typical PSI course remains one of dispensing information, questioning, motivating and guiding as in any conventional undergraduate teaching. However, these functions are discharged primarily through the unit study guides and proctor interviews rather than through verbal interaction with groups of students. The instructor still organizes the course, selects and sequences instructional materials, prepares tests and evaluates student achievement, just as in a conventional course. And the instructor is present in class daily - but not to lecture or conduct discussions. Instead, the instructor provides assistance to individual students on request, monitors proctor-student interviews and mediates student-proctor disputes, supervises the conduct of the course and occasionally conducts student interviews and checks unit tests. And just as in conventional courses the instructor grades final exams and computes the final grade of each student.

What is missing in a PSI course that characterizes the instructor's activity in a conventional course is the instructor talking at students - something which is often ego rewarding for the instructor but just as often fails to be of much help learning-wise for students. On close inspection PSI does <u>not</u> alter the accepted role of instructor, but it does change the way in which most of this role is executed. An instructor of a PSI course could become a manager if he/she so wished, but such would be a decision of the instructor, not an inherent requirement of PSI itself.

PSI and Community Colleges

Calling attention to the fact that PSI appears to possess limitations with regard to individualization, personalization, group interaction, reading effectiveness, and the role of the instructor, does not mean that PSI in reality or of necessity must incorporate such limitations. Quite the contrary. If a PSI course exhibits these undesirable attributes, it is because the designer of the course elected to include them. For those designing PSI courses for the first time, it is often difficult to avoid actually making these limitations a reality. However, by careful attention to these features in planning a PSI course an instructor can incorporate many of the ideas outlined above that will ensure that the course will not suffer from any of these limitations.

In reality, PSI seems to meet many of the requirements for instruction at the community and two-year college level. It offers a way to organize instruction that will enable diverse groups of students to handle virtually any type of course successfully at their own rates of speed - and in a place of their own choosing. PSI provides a useful link between the teacher-directed learning still typical of secondary schools to the more student-directed learning required for success in upper division levels of study, especially in four year colleges and universities, to which so many community college graduates transfer. Well constructed PSI courses also provide students guidance in how to study, a set of skills in which many community college students seem noticeably deficient. By using course graduates as proctors - in peer teaching roles - learning can be enhanced for both the students in the course and the peer proctors

themselves, and the resulting cooperative atmosphere can serve to motivate as well as increase learning. Finally, PSI may be just the means required by community colleges to provide courses for special groups of students in satellite campuses or learning centers, to senior citizens in restricted locations or to institutionalized students such as those in nursing homes or prisons.

In addition, PSI may be even more valuable as instructional system when used in conjunction with other instructional methods than when used alone. For instance, a course which requires attendance at periodic lectures and small group discussions might have a PSI track by which students progress on their own through reading and writing assignments in preparation for key lectures and discussions. PSI courses can be embellished with computers (as record keeping or test generating aids or as simulators or data banks for student use), audio-visual materials or other forms of instructional technology, if funds permit. PSI courses can also be designed to provide a variety of instructional tracks to satisfy the diverse learning styles of diverse student populations by building multiple assignments using a variety of procedures and materials to achieve the same unit goals.[11/] Additionally, PSI courses can be made quite flexible by the use of "floating" units culminating in small group discussions, by individually student-defined units of study (similar to the contracts of the old Winnetka Plan) and by offering banks of units from which students can choose to, in effect, design their own individual courses of study. The potential for improving instruction seems to be inherent in PSI without destroying the essential features of the system at any level of higher education.

Summary and Conclusion

A survey of appropriate research and some classroom experience with PSI strongly suggest that this form of instruction offers considerable potential as an inexpensive way for improving teaching, especially at the introductory level of post-secondary instruction. When weighed against the apparent strengths and weaknesses of PSI as outlined above, its utility for community colleges seems worthy of serious and sustained investigation and experimentation.

Caution is required, however. Experience with PSI raises many questions about this instructional system, some beyond the purely practical. These questions need to be answered before any large scale commitment to PSI should be made at the community college level. We need, for example, to explore in a systematic way answers to questions like: To what extent is PSI superior/inferior to the conventional methods of teaching at the community college in terms of student achievement, retention and transfer of learning? In what ways can a PSI course be modified to further individualize learning while at the same time maintaining the essential features of PSI? What kinds of community college instructors and students find PSI most useful? How many community college students can be taught effectively in a single course through PSI? And larger, more basic questions, too, arise. What really happens to students who learn through PSI? What happens to any specific subject when it is taught through PSI? Additional questions can obviously be added to this list.

Certainly PSI is not the only way to teach. This caution, too, must be emphasized. PSI is not a panacea for all the problems that face teaching at the community and two-year college level.

Rather, PSI exists as one instructional approach that effectively speaks to certain specific teaching-learning problems some of which seem particularly unique to community colleges. To be most useful PSI may have to be used in judicious combination with other modes of instruction to achieve its maximum effectiveness. It seems reasonable, for example, to think that a community college department or curriculum should use large-group lectures, small group discussions, seminars and self-paced PSI learning not only for the sake of variety but also to meet the needs of individual students at various levels of study and to facilitate the great variety of learning objectives which it seeks to accomplish.

To date, however, the potential of PSI as a form of instruction in community and two year colleges remains largely untested and untapped. If these colleges are to deal effectively with the problems of teaching increasing numbers and a greater diversity of students in the best manner possible in the face of increasing financial limitations, then PSI warrants serious consideration.

ENDNOTES

1. Fred S. Keller and J. Gilmour Sherman, The Keller Plan Handbook (Menlo Park, W. A. Benjamin Inc., 1974) pp 1-13. See also the publications of the Center for Personalized Instruction (Georgetown University, Washington, D. C., 20057), Dr. J. Gilmour Sherman, Director.
2. Fred S. Keller, "Good-bye Teacher," in J. Gilmour Sherman, ed., Personalized System of Instruction - 41 Germinal Papers (Menlo Park: W. A. Benjamin, Inc., 1974) pp 7-8. Keller and Sherman The Keller Plan Handbook, pp 6-13.
3. This figure is based on preliminary analysis of the results of a survey conducted in 1975 by The Center for Personalized Instruction (J. Gilmour Sherman to author, May 14, 1976). In 1973 the Center reported only about 430 PSI courses in existence. PSI Newsletter, II, 2 (June 1974), p 5.
4. James Kulik, "PSI: A Formative Evaluation" in Ben A. Green, Jr., ed., Personalized Instruction in Higher Education - Proceedings of the Second National Conference Held by the Center for Personalized Instruction, March 21-22, 1975 (Washington: Center for Personalized Instruction, 1976) pp. 1-13
5. See especially Bruce A. Ryan, PSI - Keller's Personalized System of Instruction: An Approach (Washington: American Psychological Association, Inc., 1974); Robert S. Ruskin, The Personalized System of Instruction: An Educational Alternative (Washington: American Association for Higher Education, 1974); Donald A. Cook, Personalized System of Instruction: Potential and Problems, (EPIE, Report #61).

6. While research studies of PSI impress in quantity and some are of the highest quality, many of these studies are impressionistic, are based on unsubstantiated student interviews, lack comparable controls, involve classes of only a dozen or fewer students and - most significantly - involve courses that modify some of the basic features of PSI beyond recognition. Hence one must take much of this research with a bit of caution! For an excellent up-to-date critical review of PSI research see Daniel E. Hursh, "Personalized Systems of Instruction:What Do the Data Indicate?" in Journal of Personalized Instruction I:2, (Sept. 1976) 91-105

7. The course described here typifies PSI courses in general. This particular course was an introductory undergraduate course in history taught by the author at Carnegie-Mellon University in Pittsburgh, Pennsylvania. Professor Beyer was assisted in designing, teaching and evaluating the initial version of the course by Dr. Thomas O'Toole and Dr. William Leaf. Their experiment was funded in part by a grant from the Carnegie Corporation to Carnegie-Mellon University. For a detailed analysis of their research see Barry K. Beyer, William Leaf and Thomas O'Toole, Final Report-History Teaching Project (106 pp) available in micro-fiche or hard copy from ERIC, 855 Broadway, Boulder, Co., 80302 (#ED 121-673).

8. Ibid.

9. See the reviews by Kulik, Ryan, Ruskin and Cook noted above. A sampling of the studies on which their works are based may be found in Sherman's, PSI - 41 Germinal Papers (also cited above).

10. Ibid.

11. For descriptions of some modifications of PSI see Sherman's PSI - 41 Germinal Papers; Jane J. Anderson, "Teaching History by the Audio Tutorial Method" in The History Teacher, III, 1 (November

1969) pp 36-41; and Robert V. Schnucker, "Individualized Self-Learning in the Teaching of Western Civilization, The History Teacher, VII, 4 (August 1974), pp 524-539.

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